PB-217 386

REPORT ON POLLUTION OF LAKE ERIE AND ITS TRIBUTARIES. PART 3. NEW YORK AND PENNSYLVANIA SOURCES

Public Health Service
Washington, D. C.

July 1965

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PB 217 386

Report on Pollution of Lake Erie and Its Tributaries

Part 3

NEW YORK AND PENNSYLVANIA SOURCES

July, 1968

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control

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I - INTRODUCTION

Part I of the report covered the main body of Lake Erie, its problems, their causes, and general remedial measures. Part 2 dealt with tributaries and subareas in Michigan, Indiana, and Ohio.

Pollution problems in three areas tributary to Lake Erie within Pennsylvania and New York, are discussed in this section of the report.

II - PENNSYLVANIA

Description of Area

The Pennsylvania Basin of Lake Erie includes the area from Twentymile Creek on the east to, but not including, Conneaut Creek on the west. The area comprises 384 square miles and is located within Erie County, Pennsylvania and Chautauqua County, New York. The basin is 46 miles long and varies in width from 6 to 13 miles. The land rises from the Lake in a steep bluff 100 to 200 feet high. This makes it generally inaccessible and unusuable for recreation, with the notable exception of Presque Isle State Park, a seven-mile long sand and gravel peninsula at Erie. This peninsula encloses Erie Harbor.

The streams in this area have steep gradients as they descend from the uplands. Flow is considerably slower through the plains. Several streams drop over a steep bluff as they flow into Lake Erie. Streams of importance are Crooked, Elk, Mill, Sixteenmile, Twentymile, and Walnut Creeks. In Sixteenmile Creek, flow has varied from 0.2 cfs (1951) to 9,710 cfs (1942).

Erie, with a 1960 population of 138,000, is the third largest city in Pennsylvania; the Erie Metropolitan complex is Pennsylvania's fifth largest, with 219,000 people.

There is a variety of industrial production in this area. Over 200 manufacturers produce machinery, steel, paper, plastics, and other products. Erie's port facilities handle over six million tons of lake shipping annually. The lakefront, particularly Presque Isle State Park, attracts people from as far as Cleveland, Pittsburgh, and Buffalo.

Water Uses

Municipal and Industrial Water Supplies

The principal source of water for both municipal and industrial usage is Lake Erie, which supplies over 90 per cent of domestic water supplies. The other 10 per cent is supplied from reservoirs and shallow wells. Three major industries and a power plant maintain their own supply systems from the Lake. The City of North East has developed Sixteenmile Creek and French Creek (in the Allegheny River Watershed) for its water supply. Only 7,000 people in urban areas use ground water.

Recreation

Erie serves as the focal point of recreation for a broad area. Swimming, boating, water skiing, and fishing and the esthetic enjoyment

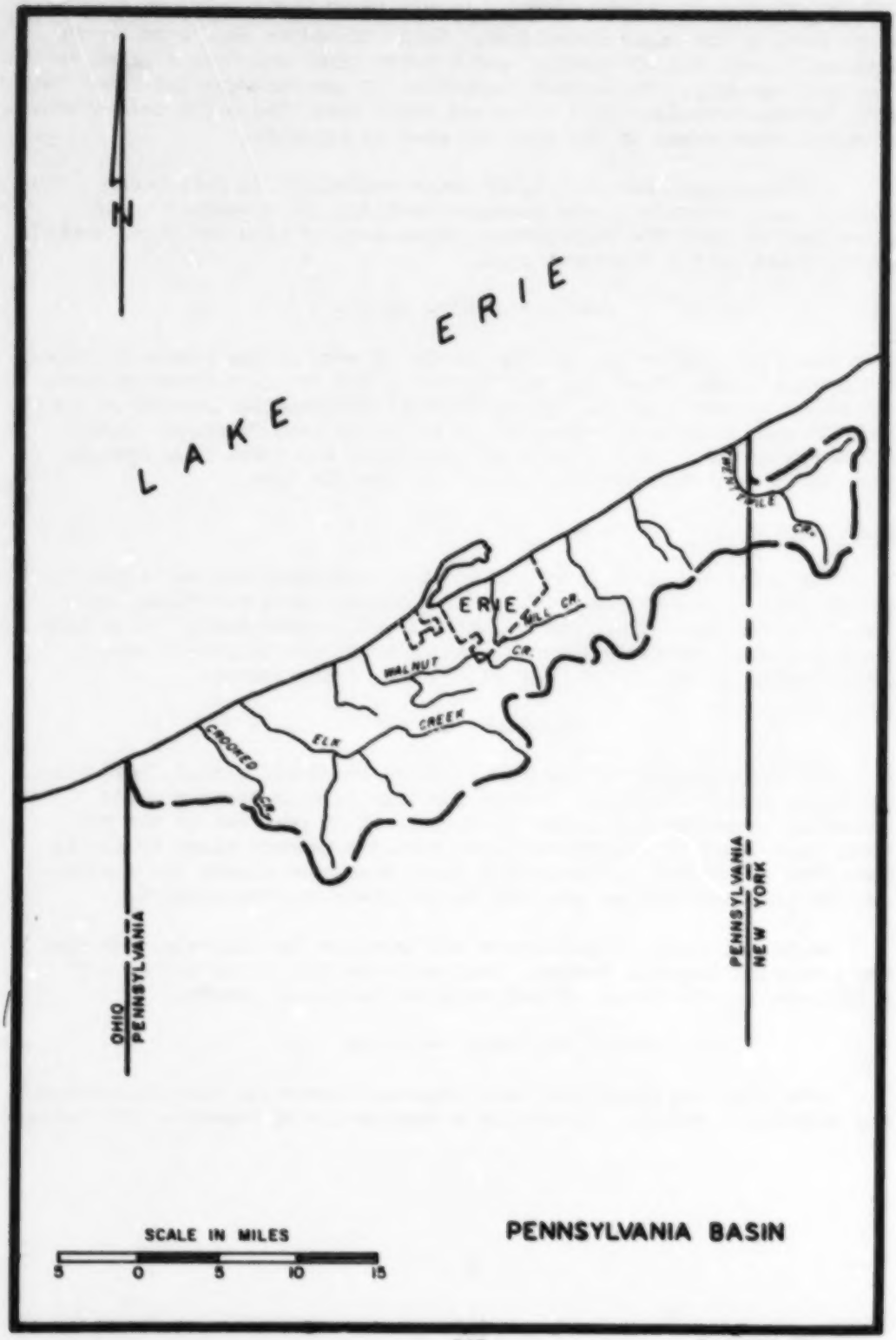

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FIGURE II - 1

3

of clean water are available throughout most of the basin. Presque Isle State Park is the major attraction. Park attendance on a warm summer weekend is over 100,000 people, and between three and four million visit the Park annually. The recent completion of new roadways and other facilities will further stimulate this important water use. The early development of adjacent beach areas to the east and west is expected.

Although there are only 4,400 boats registered in Erie County, the area is used extensively for pleasure boating. On a weekend in the mid-summer of 1962 the Pennsylvania Department of Fish and Game counted 12,000 boats in the lakefront area.

Fish and Aquatic Life

Excellent year-round fishing exists in many of the area's streams. Twentymile Creek, Trout Run, and Godfrey's Run are good trout streams. All other streams support fish life except Sixteenmile Creek from Route 89 to Route 5, Cascade Creek, Mill Creek below West Thirtieth Street, and Garrison Run. Many fish of various types are taken from Presque Isle Harbor and all along the shore and into the Lake.

Sources of Wastes

The principal sources of pollution in the basin are municipal sewage from treatment plan effluents, combined sewer overflows, and industrial wastes. Other wastes, discharged intermittently, also have severe, though temporary effects. Among these are accidental spills from vessels or industries, and wastes from lake vessels.

Municipal Wastes

The major sources of municipal wastes are Erie, Girard, Lake City, and North East. All major treatment plants in this basin provide secondary treatment and remove an average of 85 per cent of the BOD. North East and Erie chlorinate their sewage treatment plant effluents. Lake City and Girard are enlarging their treatment plants and plan to include chlorination, as required by the State of Pennsylvania.

Bacterial tests of Mill Creek and Garrison Run indicate that they are receiving domestic wastes. Samples collected in the harbor off Mill Creek in 1964 revealed high coliform bacterial counts.

Combined Sewer Overflows

Lake City and North East have separate sewers for domestic wastes and stormwater runoff. Girard has a combination of separate and combined

systems. Erie is served by a combined system, mainly in the downtown area.

Industrial Wastes

One industry, Hammermill Paper Company, contributes 90 per cent of the total oxygen demand loading to this area's water. This part of Hammermill's waste will soon be largely removed with the installation of deep well disposal. However, this will not alleviate the problem caused by the discharge of tannins and lignins from spent pulping liquors. These wastes cause the water to foam, turn brownish black in appearance, and produce a strong odor.

Other industries having discharges with a more localized effect are Gunnison Brothers, Interlake Iron Corporation, General Electric, and Parker-White Metal. Noticeable quantities of oil and iron have been observed on Fourmile Creek.

Effects of Wastes on Water Quality and Water Uses

Various communities along the lakefront have individual pollution problems. Beaches to the west of Presque Isle have maintained good quality, while those to the east, including Beach 11 on Presque Isle, have at times been severely polluted. The pollution problems at the beaches have been both bacterial and esthetic.

Fish kills have occurred sporadically in the history of the lakeshore area and the various tributaries. Many of the fish kills were caused by industrial waste discharges. A combined effort by State and local officials, and wildlife organizations has helped to curb illegal industrial discharges.

Erie Harbor

As Erie Harbor is enclosed by Presque Isle and has only a small opening into Lake Erie, flow in and out is restricted. Water color in the harbor and along the east shore is a deep brownish-tan, caused by pulp and paper wastes. Turbidity is relatively low in the harbor. Filamentous green algae (Cladophora) is present in most areas of the harbor where the depth is less than six feet. Bottom deposits in the harbor are a brownish black combination of mud, silt, and detritus (including wood fiber).

The waters of Erie Harbor near downtown marina facilities and docks, and off Mill Creek, had high coliform bacteria densities. They ranged from 1,000 to 500,000 organisms per 100 ml near Mill Creek and in the ship channel. The source of this pollution is probably Mill Creek,

where coliform densities of over 1,000,000 organisms per 100 ml occurred and from other local sources of pollution. Enteric pathogens of the Salmonella group were isolated from 80 per cent of the samples collected in both Mill Creek and the Harbor. This same organism was found in Erie's sewage.

Lake Erie Shoreline

The Hammermill Paper Company's waste outfall is located just east of the mouth of Erie Harbor. With the prevailing winds in the area from the west, Hammermill's effluent affects the water quality and esthetic appearance of beaches and boating areas for 10 to 20 miles eastward. This line of foam and foul smelling colored water is normally visible at Sixteenmile and Twentymile Creeks, and hinders the development of the eastern portion of the basin as a water supply source and as a recreational area. It also reduces the usefulness and value of lakefront property. When the wind is from the east, these wastes make parts or all of the beaches on Presque Isle unusable for water contact sports.

In addition to their adverse esthetic effects, these discharges cause severe problems with tastes and odors in domestic water supplies which require costly additional treatment. In the spring of 1964, for a period of 5 to 10 days, when the wind was from the east, the City of Erie had high tannin concentrations in its water intakes. Periodically, Erie is forced to close its eastern intake to avoid such high tannin concentrations.

In the summer of 1964, the Erie County Health Department carried out an intensive microbiological examination of the beaches at Presque Isle State Park. Presque Isle State Park officials, the U. S. Public Health Service, the Pennsylvania Department of Health, and the City of Erie cooperated in this study. A summary of the data collected in the summer of 1964 from over 4,000 separate tests appears below:

MICROBIOLOGICAL RESULTS FROM PRESQUE ISLE STATE PARK
SUMMER 1964

Beach	Total Coliform Density* Median	% Greater Than 1,000	Fecal Streptococcus Density* Median
Presque Isle - 1	36	4%	10
Presque Isle - 8	23	0%	7
Presque Isle - 10	20	0%	4
Presque Isle - 11	700	38%	5

* Count per 100 ml - preliminary evaluation, 1964 data, Millipore Filter Technique.

The data in the above table indicate that Beach 1 on the west end of the park has a source of occasional pollution which diminishes as it progresses along the beach, whereas Beach 11 on the eastern tip is affected by larger and more consistent sources of pollution.

Preliminary analyses indicate that, except for short periods, all of the beaches except Beach 11 are relatively free from pollution. Beach 11 was closed as a precautionary measure several times this past summer by Park officials while all western beaches remained open at all times.

Recommended Actions

The recommendations for pollution abatement set forth in Chapter I, Part 1 are to be adopted where applicable in the Pennsylvania Basin. In addition, it is recommended that the following specific actions be taken:

1. The Erie metropolitan area develop a plan which will outline the steps to be taken to provide solutions to pollution created by combined sewer overflows.

2. The following industrial plants take the necessary actions listed:

Industry		Necessary Action
Hammermill Paper Company	-	Reduction of Solids and Spent Cook Liquors
Interlake Iron Company	-	Reduction of Phenols and Solids

III - WESTERN NEW YORK

Description of Area

The western New York Basin (Figure III-1) extends from (but does not include) Twenty-Mile Creek on the New York-Pennsylvania boundary on the west to the divide between the Silver Creek and Cattaraugus Creek watersheds on the east. This basin is located almost wholly within Chautauqua County. A small segment of the Silver Creek Basin is contained in Cattaraugus County.

The basin is approximately 40 miles long, varies in width from 4 to 13 miles, and contains 247 square miles. The land rises from the lake in a steep bluff 50 to 100 feet high, which makes it inaccessible and unusable for recreation.

The three major streams are Chautauqua, Canadaway, and Silver Creeks. Each drains between 36 and 52 square miles and is 15 to 20 miles long. The streams have a fairly steep gradient with an average slope of over 50 feet per mile. The lower reaches of the basins are relatively flat, the majority of the fall taking place in the upper reaches.

Outside of the urban areas of Dunkirk, Fredonia, Silver Creek, and Westfield, this area is predominantly farmland and woodland. The 1960 census lists 51,328 people within the basin. The two largest cities are Dunkirk (19,746) and Fredonia (8,477).

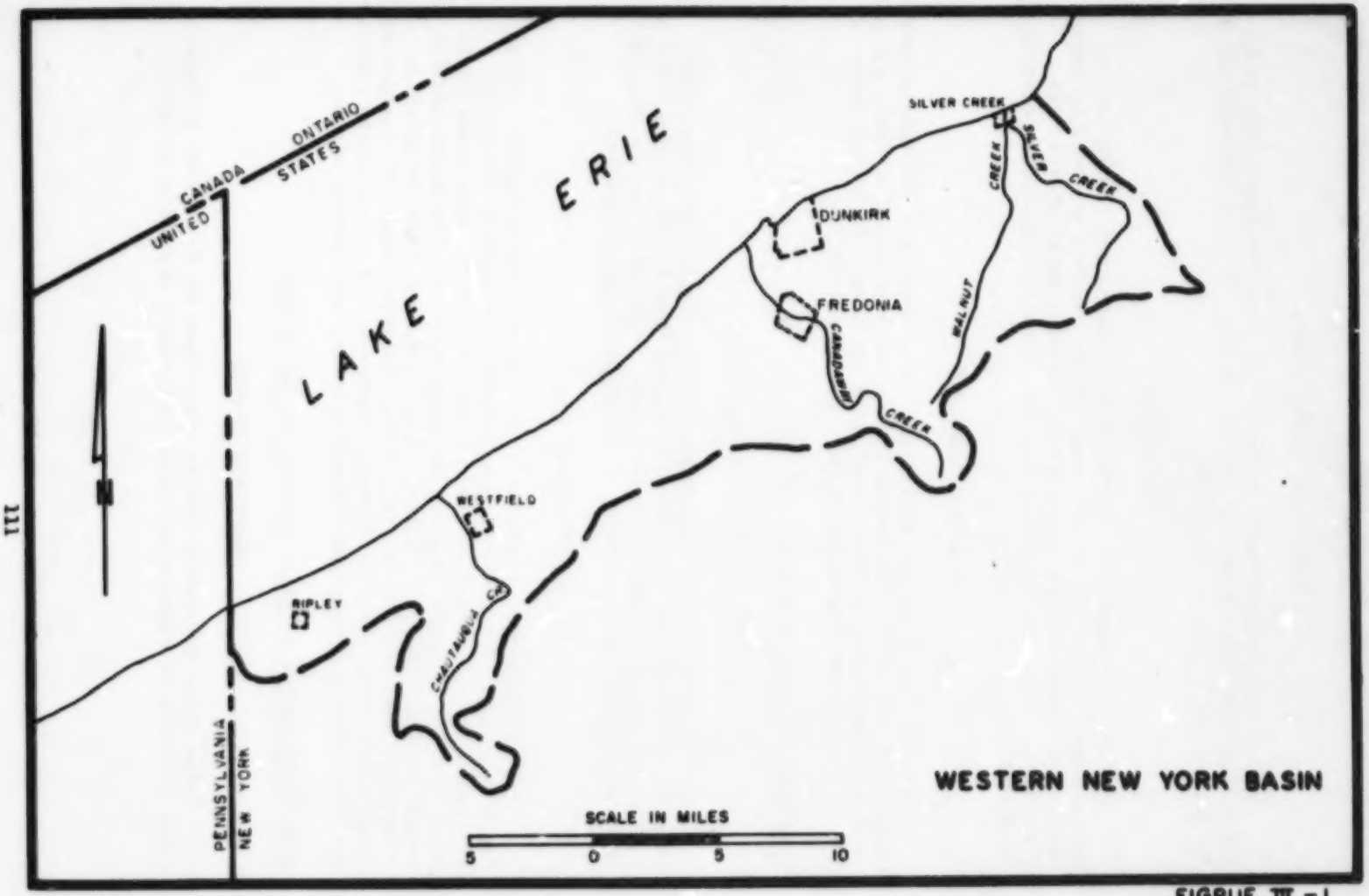
The cities of Silver Creek, Dunkirk, Fredonia, and Westfield have industries centered around food and grape processing, metal fabricating, and clothing production. The chief farming activities are dairy farming, truck farming, and vineyards.

Water Uses

Water for both municipalities and industries is taken mainly from Lake Erie and other surface water sources. Excluding industrial cooling water, about 53 per cent of the water is obtained from Lake Erie, 46 per cent from various creeks, and 1 per cent from wells.

Municipal Water Supply

Dunkirk obtains a municipal water supply of 4.0 million gallons per day (mgd) from Lake Erie. Fredonia (1.2 mgd), Westfield (1.1 mgd), Silver Creek (1.0 mgd), and Brocton (0.45 mgd) obtain their water from Canadaway, Chautauqua, Silver, and Slippery Rock Creeks respectively.


CANADA
UNITED
ONTARIO
STATES
LAKE
ERIE
SILVER CREEK
SILVER CREEK
DUNKIRK
FREDONIA
CANADAWAY CREEK
WALNUT
WESTFIELD
RIPLEY
CHAUTAUQUA CR.
PENNSYLVANIA
NEW YORK
N
SCALE IN MILES
5
0
5
10
WESTERN NEW YORK BASIN

FIGRUE III - 1

Industrial Water Supply

The Niagara-Mohawk Power Corporation's Dunkirk Plant uses about 600 mgd of Lake Erie water for cooling water. This is the only major industrial water use in this area.

Recreation

The City of Dunkirk's two municipal beaches are the center for recreational activities of the area. These beaches are heavily used during the summer months by swimmers, boaters, water skiers, and fishermen. There are no public bathing areas on the streams covered in this study.

Fish and Aquatic Life

A variety of fish are available from streams and the lake shoreline. Chautauqua and Little Chautauqua Creeks are both trout streams, and are used for spawning by rainbow trout from the lake. Pollution prevents the full usage of Canadaway, Silver, and Walnut Creeks.

Principal Sources of Wastes

Municipal Wastes

Excluding the summer population at two state parks, two cities provide secondary treatment for the wastes from 12,300 people. There are 20,500 people served by three primary treatment plants. Eighteen thousand people are not served by municipal sewerage systems.

Industrial Wastes

Twelve industries discharge wastes to the area's waters. Welch Grape Juice Co., Inc., discharges pressing and process wastes and storage tank wash waters at Brocton and Westfield. Seneca Westfield Maid, Inc. and Growers Cooperative Grape Juice Co. discharge similar wastes in Westfield. In Dunkirk, Niagara-Mohawk Power Corporation discharges heat and flyash; Twin Cities Asphalt Company discharges solids; Great Lakes Color Printing Company discharges ink and cleaning solutions; and City Laundry discharges fibrous material and laundry wastes.

Effects of Wastes on Water Quality and Water Uses

Westfield-Brocton

Grape juice processing wastes discharged by four firms in Brocton cause problems of appearance, odor, and oxygen depletion in their

receiving waters. Brocton also discharges raw and partially treated domestic sewage to Slippery Rock Creek.

Dunkirk

The main pollution problem at Dunkirk is that of flyash from the Niagara-Mohawk power plant. The flyash is dumped as land fill behind the plant but is washed into the harbor during rains. In sections of the harbor, flyash deposits were as much as two feet deep.

Dunkirk harbor has problems with algae, especially Cladophora. Storms break them loose and they are washed onto the beaches of the area where they decompose, producting a foul odor. Dunkirk's harbor is shallow and rooted aquatic weeds and algae grow abundantly, making boating almost impossible. Cladophora growths are heavy outside the breakwater.

A heavy black slick occurs below Great Lakes Color Printing Company. Brown discoloration and suspended solids are found near the Twin Cities Asphalt Company discharge. Fiber deposits on the stream bank and a slight discoloration of the stream can be observed from City Laundry.

In the summer of 1964, the City of Dunkirk conducted an extensive study of its two major bathing areas. Total coliform densities ranged from 8 to 500,000 organisms per 100 ml. The mean coliform density exceeded the recreational objectives of 1,000 organisms per 100 ml for 34 per cent (Point Gratiot) and 49 per cent (Wright Park) of the time sampled. The beaches are now closed for one to ten days after rainfall or strong winds.

Silver Creek

Walnut Creek and Silver Creek are polluted by raw sewage discharged from Forestville and Silver Creek and by wastes discharged by the Silver Creek Preserving Company. This pollution renders the area unsuitable for any water contact sports.

Recommended Actions

The recommendations for pollution abatement set forth in Chapter I, Part 1 are to be adopted where applicable in the Western New York Basin. In addition, it is recommended that the following specific actions be taken:

1. The following industrial plants take the necessary actions listed:

Industry	Necessary Action
Niagara Mohawk Power Company	Keep flyash out of Lake
Silver Creek Preserving Company	BOD reduction
Welch Grape Juice Company, Inc.	BOD reduction
Seneca Westfield Maid, Inc.	BOD reduction
Growers Cooperative Grape Juice Co.	BOD reduction

IV - ERIE-NIAGARA

Description of Area

The portion of the Erie-Niagara Basin that drains to Lake Erie (Figure IV-1) extends from the head of the Niagara River on the east through the Cattaraugus Creek watershed on the west.

Cities and Industries

The Erie-Niagara Basin is one of the top 14 manufacturing centers in the United States. An abundant water supply, low cost power, excellent transportation, a pool of skilled labor, and an advantageous location have been the main factors in the area's economic development. Primary metals, chemicals, transportation equipment, and grain products comprise the principal products. Although the area is noted for its heavy industry, agriculture is also an important part of the economy. Dairy products, fruit, and truck farming are the principal farm products. Buffalo is the second largest city in New York, with a population of over 500,000. The Buffalo complex is the center of industry and business for the Basin.

Streams

The major streams in the Basin rise in the Appalachian uplands and flow down through the lowlands to Lake Erie. These streams and their larger tributaries are potential sources of water supply, particularly those in the upland valleys. The average flow varies from 125 cfs on Cayuga Creek to 717 cfs on Cattaraugus Creek. The smaller streams and tributaries, especially those of the lowlands, go dry or are reduced to a very low flow in the summer.

Water Uses

Lake Erie and the Niagara River are the major sources for all domestic and industrial water supplies for this Basin. Just under 1,000 million gallons per day (mgd) of water are used, of which 25 to 30 per cent is used for domestic consumption, and 70 to 75 per cent by industry for cooling and process water.

Municipal Water Supply

Over 260 mgd of water, on an average, is supplied to more than a million domestic users. Wells, springs, and several creeks provide less than 2 per cent of the water, while approximately 36 per cent is taken from the Niagara River and 62 per cent from Lake Erie. The majority of all domestic water is distributed by the Erie and Niagara County Water Districts, and the municipal systems of Buffalo, Lockport, and the Tonawandas. Regions which in the past have had to depend on

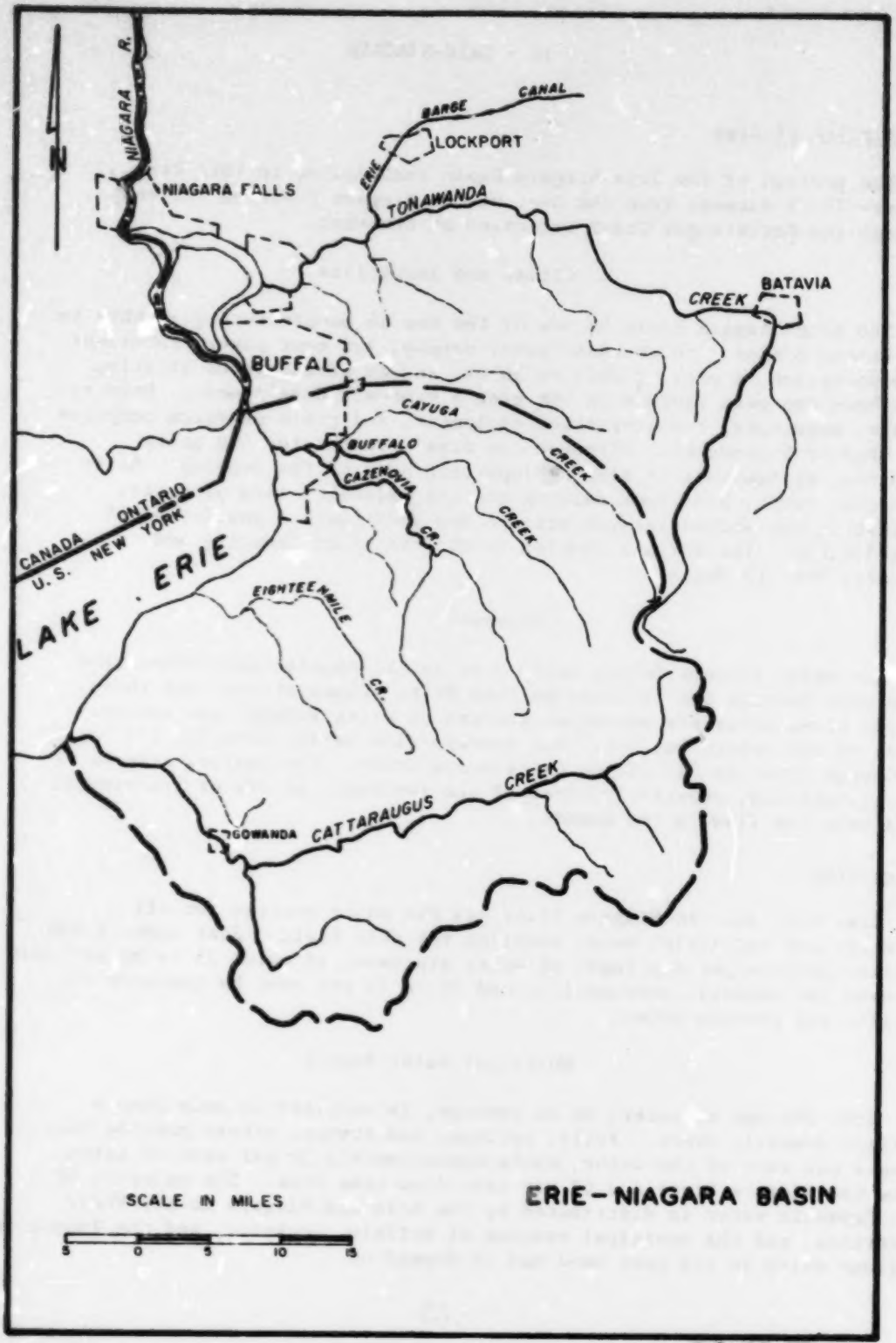

N
NIAGARA R.
NIAGARA FALLS
ERIE BARGE CANAL
LOCKPORT
TONAWANDA
BATAVIA
CREEK
BUFFALO
CAYUGA
BUFFALO
CAZENOVIA CR.
CREEK
CREEK
CANADA
ONTARIO
U.S.
NEW YORK
LAKE ERIE
EIGHTEEN MILE CR.
CATTARAUGUS CREEK
SCALE IN MILES
5 0 5 10 15
ERIE-NIAGARA BASIN

FIGURE IV-1

poor-quality, low-yield well supplies now have an adequate water supply of good quality.

Industrial Water Supply

Industries in the Erie-Niagara Basin use an estimated 700 mgd of water, primarily for cooling. Five industries along the Buffalo River that now draw their cooling water from the Buffalo are installing an intake in Buffalo Harbor to obtain higher quality (lower temperature) water. This cooling water, when it is discharged to the Buffalo, will act as a dilutant to this heavily polluted river.

Waterborne Commerce

The Port of Buffalo, as a link in an extensive water transportation system and as a major Lake Erie port, is important to the local economy. The Port of Buffalo is comprised of two basic sections. The Buffalo River has a 125 - 150 foot wide, six-mile-long navigation channel with a minimum depth of 21 feet. Buffalo Harbor, 4-1/2 miles long and 1,600 feet wide, is formed by a breakwater system and has 56 terminals. The chief cargoes handled are iron ore, coal, grain, limestone, sand and gravels, steel products, scrap, flour, petroleum products, automobiles, and sulfur.

Recreation

The Erie-Niagara Basin has an extensive recreation system. The crown of this system is world-famous Niagara Falls. Over three million visitors a year come to view the falls, and provide a large tourist income to surrounding communities in the United States and Canada.

Water-oriented recreational opportunities extend from Niagara Falls to the wilds of the upper Zoar Valley. Recreation is in fact one of the most important uses of the waters of the Basin. Fishing, swimming, boating, water skiing, and the esthetic enjoyment of clean water are available in many areas of the Basin.

The demand for lakefront parks and boating facilities is high. From Beaver Island State Park on the north to Evangola State Park on the south, a number of beaches are available for public use. Beaver Island and Evangola State Parks are operated by the Niagara Frontier State Park Commission and have maximum attendance of 40,000 and 25,000 respectively on a summer weekend. Beaver Island has replaced the Buffalo waterfront as a recreation center owing to the latter's heavy industrial pollution.

Fish and Aquatic Life

Excellent fishing exists in many of the area's streams. Warm water fish such as bass, pike, perch, bullheads, and catfish are available in the main streams and lower tributaries. Trout can be taken in the upper tributaries. The following waters support some type of fish life: Lake Erie, eastern end; Buffalo Creek system, upper reaches; Smokes Creek, upper reaches; Eighteenmile Creek; and Cattaraugus Creek, upper reaches. However, industrial and domestic pollution have made heavy inroads on waters of the basin. Big Sister Creek was once a useful trout stream. Bass and other fish could once be taken from the portion of Cattaraugus Creek below Gowanda. Fish in the lower Buffalo Creek system and Smokes Creek have vanished.

Esthetics

The polluted waters in many areas of the basin detract from the beauty and limit recreational use. The Buffalo River and the Erie-Niagara shorefront are examples. Gowanda, on Cattaraugus Creek, presents another esthetic eyesore. The value of property adjacent to polluted water is significantly decreased.

Principal Sources of Wastes

Raw or inadequately treated wastes discharged by industries and municipalities are the principal sources of pollution in this area. Other wastes, which have serious effects, are accidental spills from vessels or industries, land runoff, and wastes from lake vessels.

Municipal Wastes

The estimated total discharge for the Erie-Niagara basin is between 900,000 and 1,000,000 population equivalent (PE). This represents a net reduction in BOD by treatment of only 37 per cent. Individual cities vary from Attica (90%), Arcade (90%), and Orchard Park (87%) to Buffalo (22%), and Tonawanda Twp. (12%) removal. Improved treatment and collection facilities are needed in many areas.

Combined Sewer Overflows

Cities in the Erie-Niagara Basin have relatively long histories. Many cities were founded in the early 1800's and have inherited the antiquated combined sewer systems of early days. Quantities of sewage and industrial wastes are discharged to the waterways whenever excess storm runoff occurs. There are over 30 overflows on the Buffalo River alone. There are areas such as Gowanda and others which continually discharge untreated sewage. Corrective action is needed to remove these sources of pollution.

Industrial Wastes

There are two significant sources of industrial pollution in the Cattaraugus Creek drainage basin. These industries are the Peter Cooper Corporation and the Moench Tanning Company. Each discharges wastes having a high oxygen demand and considerable quantities of suspended solids. The industrial waste data (1960) for these industries are summarized below:

Cattaraugus Creek - Industrial Waste Data

	Flow mgd	BOD lbs/day	BOD P.E.	Suspended Solids lbs/day
Peter Cooper Corp.	3.59	25,800	155,000	9,580
Moench Tanning Co.	1.67	8,730	52,400	7,600
Total	5.26	34,530	207,400	17,180

The estimated population in the Cattaraugus Creek drainage basin is 36,000 people; these two industries discharge wastes equivalent in oxygen demand to more than five times this number.

Smokes Creek flows through the City of Lackawanna and the Bethlehem Steel Company property before it empties into the Lake. An indeterminate but large amount of industrial waste is discharged to the Creek by Bethlehem before it enters the Lake. Bethlehem Steel Company also dishcarges wastes to the Lakeshore and the harbor areas. Bethlehem Steel is one of the major sources of pollution in the Smokes Creek area, but detailed data concerning its discharges have not been made available by the State.

There are five major industries on the Buffalo River. They use the Buffalo River as a source of water supply and also for waste transport. The section of the river where these industries are located is grossly polluted. The type of wastes discharged by each industry is tabulated below:

Buffalo River - Industrial Waste Discharges

Industry	Type
National Aniline	Synthetic Dyes
Socony Vacuum Oil Co.	Oil, phenolics, cyanides
Donner-Hanna Coke Co.	Phenolics, cyanide, Ammonium, oil, Solids, and BOD
Republic Steel Corp.	Phenolics, cyanide, oil, and solids
General Chemical	Inorganic

Details of quantity and types of waste discharged by each firm have not been made available. These five industries have jointly formed a corporation with the specific purpose of obtaining a suitable water supply. A multi-million dollar project is presently under construction to obtain a water supply from Lake Erie. The project will have a capacity of about 200 mgd and will be used primarily to furnish cooling water. The industries propose to use this water on a once through basis, returning it directly to the River. This increased flow will flush wastes from the Buffalo River into Lake Erie, but it will not in itself reduce the input of wastes to the Lake.

Sedimentation is a problem in several areas in the Basin. High sediment loads are related to heavy rainfalls or snow melts, and last for only short periods of time. The average annual sediment load for all areas except the upper Buffalo and Tonawanda areas ranges from 100 to 1,500 tons per year per square mile.

Over 100,000 tons of sediment must be dredged from the Buffalo River yearly to keep its navigation channel open. Data indicate that some of this sediment originates from industrial wastes discharged in the river.

Effects of Wastes on Water Quality and Water Uses

Waste discharges in the Erie-Niagara Basin affect the immediate receiving stream, the shoreline, and the eastern side of the Niagara River.

Shoreline and Recreation Areas

In the summer of 1964, an extensive microbiological study of the major public beaches was conducted by the Erie County Department of Health. Beaches were examined from Evangola State Park on the west to Beaver Island State Park on the east. It was found that in most cases there was a direct correlation between rainfall and high or gusty winds and coliform densities. Several of these beaches are now automatically closed to the public after rainfall and/or high winds, for one to three days. The beaches were affected by nearby streams carrying wastes, by sewage treatment plant discharges, and by combined sewer system overflows.

Cattaraugus Creek

Raw domestic sewage, toxic wastes, oil, organic loadings are poured into Cattaraugus Creek in the vicinity of Gowanada by Peter Cooper Corp., Moench Tanning Co., and the Village of Gowanda. Dumps

are located along the creek banks. Above these outfalls the stream is clear; below them the stream becomes a virtual cesspool during low flow months. Damage to fish and wildlife and recreation by pollution occurs in that part of the basin below the outfalls.

Eighteenmile Creek

Eighteenmile Creek is relatively free from pollution except in the vicinity of Hamburg, while Big Sister Creek has been grossly polluted and was only 30 per cent sewered. With the recent construction of two new sewage treatment plants in the area, water quality in Big Sister Creek should improve. Both of these streams have a potential as fish and recreation areas.

Buffalo River System

The Buffalo River Basin is composed of the Buffalo River and its tributaries of Cazenovia Creek, Cuyuga Creek, and Buffalo Creek.

Under prevalent conditions of sluggish flow, the lower Buffalo River resembles a vast septic tank, with no dissolved oxygen and high biochemical oxygen demand during critical periods, and with oil, color and exotic waste materials. Following heavy rainfall combined sewer overflows and bottom scourings threaten the quality of the water supplies of the City of Buffalo and other municipalities. The Buffalo River is too grossly polluted to support fish, bottom dwelling animals, or attached algae.

Except for high coliform densities, the water in Cayuga Creek above Lancaster and Depew is good in quality. At low flow, Cayuga Creek becomes septic below the Depew Sewage Treatment Plant. Oil discharges have been noted in the lower seven miles of the Creek.

The West Branch of Cazenovia Creek is of good sanitary quality; so is the East Branch except for its last two miles which have a high BOD loading from the East Aurora Sewage Treatment Plant. Cazenovia Creek's water quality remains relatively high until the stream reaches West Seneca. The stream supports a well-balanced population of bottom dwelling animals which include many pollution-sensitive forms.

Pollution from sewer discharges in the lower six miles of the stream degrade the water quality until, near the mouth, the DO at times becomes zero.

Recommended Actions

The recommendations for pollution abatement set forth in Chapter I, Part 1 are to be adopted where applicable in the Erie-Niagara Basin. In addition, it is recommended that the following specific actions be taken:

1. The Buffalo metropolitan area develop a plan which will outline the steps to be taken to provide solutions to water pollution created by combined sewer overflows.

2. Necessary action be taken to eliminate oil and debris in the Lake, tributaries, and harbor waters.

3. The following industries provide waste treatment or reduction of waste at its source to eliminate water pollution: Allied Chemical and Dye Corporation, General Chemical Division; Allied Chemical & Dye Corp., National Aniline Division; Bethlehem Steel Co.; Donner-Hanna Coke Corporation; Electric Materials Co.; Erie Brewing Co.; Erie Reduction Co.; Hanna Furnace Corporation; Kaiser Aluminum Co.; Moench Tanning Co.; Penn-Dixie Cement Co.; Peter Cooper Corp.; Socony-Vacuum Oil Company; Union Plating Works.

U.S. GOVERNMENT PRINTING OFFICE 1961 O-587181